

## CLAIMS

1 - A magnetic sensor for determining the location of a moving object (2) moving along an axis of displacement (T), the sensor including:

- an open magnetic circuit (3) delimiting at least one gap (8) and including means (4) for creating a magnetic flux, mounted, displaceable by the moving object (2), delimiting at least one gap (8),
- at least one first measuring cell (11) fixedly mounted in the magnetic circuit (3) and capable of measuring the value of the magnetic flux relatively to the axis of displacement,

10 - means for processing the output signal delivered by the measuring cell (11) in order to determine the linear location of the moving object along the axis of displacement, characterized in that:

- the magnetic circuit (3) also includes at least one pole piece (5) associated with means for creating a magnetic flux orientated at least perpendicularly to the surface (6) of the pole piece, from the pole piece emerges a magnetic leakage flux, the strength of which varies at the surface of the pole piece along the axis of displacement (T),
- the measuring cell (11) is mounted near an extreme point of displacement so as to measure the magnetic flux delivered by the creating means (4) minus the magnetic leakage flux.

15 2 - The magnetic sensor according to claim 1, characterized in that it includes a second measuring cell (13) fixedly mounted in the magnetic circuit (3) near the other extreme point of displacement so as to measure the magnetic flux delivered by the creating means (4) minus the magnetic leakage flux.

20 25 3 - The magnetic sensor according to claim 1 or 2, characterized in that the means for creating a magnetic flux (4) are mounted, displaceable in translation.

30 4 - The magnetic sensor according to claim 2, characterized in that the processing means for determining the location of a moving object (2), calculates the difference between the output signals delivered by the first (11) and the second (13) measuring cells.

5 - The magnetic sensor according to claim 2, characterized in that the processing means for determining the location of the moving object (2), calculates

the difference between the output signals delivered by the first (11) and the second (13) measuring cells, divided by the sum of the output signals delivered by the first and second measuring cells.

5       **6 -** The magnetic sensor according to claim 1, 4 or 5, characterized in that the processing means include means for analyzing each output signal in an independent or combined manner in order to establish a diagnose on the operating state of each measuring cell (11, 13).

10      **7 -** The magnetic sensor according to any of claims 1 to 6, characterized in that the means for creating a magnetic flux (4) consist of a radially magnetized annular component (14), the axis of which is parallel to the axis of translational displacement.

15      **8 -** The magnetic sensor according to any of claims 1 to 6, characterized in that the means for creating a magnetic flux consist of a series of at least four magnets (15), the magnetization directions of which are shifted by 90°, two-by-two.

15      **9 -** The magnetic sensor according to any of claims 1 to 8, characterized in that the open magnetic circuit (3) includes a second pole piece (18) positioned facing the first pole piece (5), delimiting a gap (19) with the latter.

20      **10 -** The magnetic sensor according to claim 9, characterized in that the second pole piece (18) is provided with means for creating the magnetic flux (4).

20      **11 -** The magnetic sensor according to claims 5 and 9, characterized in that the second pole piece (18) is formed with a tubular component equipped with the radially magnetized annular component (14).

25      **12 -** The magnetic sensor according to claim 1 or 8, characterized in that either one of the pole pieces (5, 18) has a suitable planar profile for improving the linearity of the output signal delivered by the measuring cells (11, 13).